

**CLAIMS:**

What is claimed is:

1 1. A method for loading a class, comprising:  
2 loading a class;  
3 inserting an immutability flag into the class;  
4 determining whether the class is immutable; and  
5 setting the immutability flag if the class is  
6 immutable.

1 1. 2. The method of claim 1, wherein the step of  
2 determining whether the class is immutable comprises:  
3 parsing the bytecode of the class.

1 1. 3. The method of claim 2, wherein the step of  
2 determining whether the class is immutable further  
3 comprises:  
4 determining whether the class can be modified after  
5 it is created.

1 1. 4. The method of claim 3, wherein the step of  
2 determining whether the class can be modified comprises  
3 determining whether all properties of the object are  
4 marked private.

1 1. 5. The method of claim 3, wherein the step of  
2 determining whether the class can be modified comprises  
3 determining whether there are any non-private methods  
4 that update properties of the class.

1 6. The method of claim 1, further comprising:  
2 receiving a request to invoke a server application;  
3 examining an argument in the request;  
4 if the argument is an object, determining whether  
5 the object is immutable; and  
6 if the object is immutable, passing a reference to  
7 the object rather than a clone of the object.

1 7. The method of claim 6, wherein the step of  
2 determining whether the object is immutable comprises:  
3 determining whether an immutability flag for the  
4 object is set.

1 8. A method for invoking an object, comprising:  
2 receiving a request to invoke an object;  
3 examining an argument in the request;  
4 if the argument is an object, determining whether  
5 the object is immutable; and  
6 if the object is immutable, passing a reference to  
7 the object rather than a clone of the object.

1 9. The method of claim 8, wherein the step of  
2 determining whether the object is immutable comprises:  
3 determining whether an immutability flag for the  
4 object is set.

1 10. The method of claim 8, further comprising:  
2 if the object is not immutable, passing a clone of

3 the object as the argument.

1 11. An apparatus for loading a class, comprising:  
2 loading means for loading a class;  
3 insertion means for inserting an immutability flag  
4 into the class;  
5 first determination means for determining whether  
6 the class is immutable; and  
7 setting means for setting the immutability flag if  
8 the class is immutable.

1 12. The apparatus of claim 11, wherein the first  
2 determination means comprises:  
3 parsing means for parsing the bytecode of the class.

1 13. The apparatus of claim 12, wherein the first  
2 determination means further comprises:  
3 second determination means for determining whether  
4 the class can be modified after it is created.

1 14. The apparatus of claim 13, wherein the second  
2 determination means comprises means for determining  
3 whether all properties of the object are marked private.

1 15. The apparatus of claim 13, wherein the second  
2 determination means comprises means for determining  
3 whether there are any non-private methods that update  
4 properties of the class.

1 16. The apparatus of claim 11, further comprising:  
2 receipt means for receiving a request to invoke a  
3 server application;  
4 examination means for examining an argument in the  
5 request;  
6 third determination means for determining whether  
7 the object is immutable if the argument is an object; and  
8 reference means for passing a reference to the  
9 object rather than a clone of the object if the object is  
10 immutable.

1 17. The apparatus of claim 16, wherein the third  
2 determination means comprises:  
3 means for determining whether an immutability flag  
4 for the object is set.

1 18. An apparatus for invoking an object, comprising:  
2 receipt means for receiving a request to invoke an  
3 object;  
4 examination means for examining an argument in the  
5 request;  
6 determination means for determining whether the  
7 object is immutable if the argument is an object; and  
8 reference means for passing a reference to the  
9 object rather than a clone of the object if the object is  
10 immutable.

1 19. The apparatus of claim 18, wherein the determination  
2 means comprises:

3       means for determining whether an immutability flag  
4   for the object is set.

5   20. The apparatus of claim 18, further comprising:  
6       clone means for passing a clone of the object as the  
7   argument if the object is not immutable.

1   21. A computer program product, in a computer readable  
2   medium, for loading a class, comprising:  
3       instructions for loading a class;  
4       instructions for inserting an immutability flag into  
5   the class;  
6       instructions for determining whether the class is  
7   immutable; and  
8       instructions for setting the immutability flag if  
9   the class is immutable.

1   22. A computer program product, in a computer readable  
2   medium, for invoking an object, comprising:  
3       instructions for receiving a request to invoke an  
4   object;  
5       instructions for examining an argument in the  
6   request;  
7       instructions for determining whether the object is  
8   immutable if the argument is an object; and  
9       instructions for passing a reference to the object  
10   rather than a clone of the object if the object is  
11   immutable.